IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	: 10/067,938	Confirmation No.	: 8443
First Named Inventor	: Yutaka MATSUNOBU		
Filed	: February 8, 2002		
TC/A.U.	: 3618		
Examiner	: Frank Vanaman		
Docket No.	: 056203.49196DV		
Customer No.	: 23911		
Title	: Hybrid Electrical Vehicle Employing Permanent Magnetic Type Dynamo-Electric Machine		

CERTIFICATE OF FACSIMILE TRANSMISSION

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I hereby certify that an original of this Communication along with a copy the Fee Transmittal Form filed on March 21, 2005, a copy of the Two-month Petition for Extension of Time filed on March 21, 2005, a copy of the Amendment filed on March 21, 2005 and a copy of the date-stamped postcard is being faxed to Examiner Frank Vanaman at the U.S. Patent and Trademark Office (fax number: (703) 305-7687) on March 22, 2005.

Respectfully submitted,

March 22, 2005

Vincent J. Sunderdick
Registration No. 29,004

CROWELL & MORING LLP
Intellectual Property Group
P.O. Box 14300
Washington, DC 20044-4300
Telephone No.: (202) 624-2500
Facsimile No.: (202) 628-8844
VJS:ddd

Enclosures: Communication
Copy of Fee Transmittal Form filed on March 21, 2005
Copy of Two-month Petition for Extension of Time filed on March 21, 2005
Copy of Amendment filed on March 21, 2005
Copy of date-stamped postcard

#367176

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	: 10/067,938	Confirmation No.	: 8443
First Named Inventor	: Yutaka MATSUNOBU		
Filed	: February 8, 2002		
TC/A.U.	: 3618		
Examiner	: F. Vanaman		
Docket No.	: 056203.49196DV		
Customer No.	: 23911		

Title : Hybrid Electrical Vehicle Employing Permanent Magnetic Type Dynamo-Electric Machine

COMMUNICATION

NOT FOR FILING
COPY OF
ALREADY FILED
DOCUMENTS ON MARCH 21, 2005

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Enclosed is a copy of an Amendment as well as the papers filed in conjunction with authorization for extensions of time, which was inadvertently filed on March 21, 2005 with a serial number and filing date associated with the parent application of the above-identified application. Also, enclosed is a copy of the date-stamped postcard.

Applicants respectfully request that this Amendment be entered in the above-identified application instead of in the parent application (serial no.: 09/654,615). Applicants submit that a reading of the first page of this Amendment clearly indicates that it was intended to be filed the above-identified application as it reads "In response to the patent Office dated September 20, 2004 . . ."

This request is being made one day after the inadvertent filing with the incorrect serial number.

On another note, the check attached is for the payment of a two-month extension, but the transmittal authorizes the charging of any additional fees to Deposit Account No.: 05-1323 and that such response was filed along with the

Attorney Docket No.: 056203.49196DV
Application No. 10/067,938

proper authorization for payment in a timely fashion to avoid abandonment of the above-identified application.

If there are any questions or any further requirements, the Examiner is requested to contact the undersigned attorney at (202) 624-2838.

Respectfully submitted,

March 22, 2005

Vincent J. Sunderdick
Registration No. 29,004

CROWELL & MORING LLP
Intellectual Property Group
P.O. Box 14300
Washington, DC 20044-4300
Telephone No.: (202) 624-2500
Facsimile No.: (202) 628-8844
VJS:ddd

Enclosures: Copy of Fee Transmittal Form filed on March 21, 2005
Copy of Two-month Petition for Extension of Time filed on March 21, 2005
Copy of Amendment filed on March 21, 2005
Copy of date-stamped postcard

#367161

COPY

PTO/SB/17 (12-04)
Approved for use through 07/31/2006. OMB 0651-0032
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Effective on 12/08/2004.
Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).

FEE TRANSMITTAL
For FY 2005

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT	($) 450

Complete if Known	
Application Number	09/654,615
Filing Date	September 7, 2000
First Named Inventor	Yutaka MATSUNOBU
Examiner Name	F. B. Vanaman
Art Unit	7893
Attorney Docket No.	056203.49196DV

METHOD OF PAYMENT (check all that apply)

☒ Check ☐ Credit Card ☐ Money Order ☐ None ☐ Other (please identify):

☒ Deposit Account Deposit Account Number: 05-1323 (Docket No. 056203.49196) Deposit Account Name: 23911

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

☐ Charge fee(s) indicated below ☐ Charge fee(s) indicated below, except for the filing fee

☒ Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17 ☒ Credit any overpayments

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

FEE CALCULATION

1. BASIC FILING, SEARCH, AND EXAMINATION FEES

	FILING FEES		SEARCH FEES		EXAMINATION FEES		
		Small Entity		Small Entity		Small Entity	
Application Type	Fee ($)	Fee ($)	Fee ($)	Fee ($)	Fee ($)	Fee ($)	Fees Paid ($)
Utility	300	150	500	250	200	100	
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	

2. EXCESS CLAIM FEES

Fee Description	Fee ($)	Small Entity Fee ($)
Each claim over 20 or, for Reissues, each claim over 20 and more than in the original patent	50	25
Each independent claim over 3 or, for Reissues, each independent claim more than in the original patent	200	100
Multiple dependent claims	360	180

Total Claims	Extra claims	Fees($)	Fee Paid ($)
4 -20 or HP		x =	

HP = highest number of total claims paid for, if greater than 20

Indep. Claims	Extra claims	Fees($)	Fee Paid ($)
2 - 3 or HP		x =	

HP = highest number of total claims paid for, if greater than 3

Multiple Dependence Claims	
Fee($)	Fee Paid ($)

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee ($)	Fee Paid ($)
- 100 =	/ 50 =	Round up to a whole number	x =	

4. OTHER FEES

	Fee Paid ($)
Non-English Specification, $130 fee (no small entity discount)	
Other Two-month Petition for Extension of Time	$450

SUBMITTED BY

Signature	Vincent J. Sunderdick	Registration No. (Attorney/Agent) 29,004	Telephone (202) 624-2500
Name (Print/Type)	Vincent J. Sunderdick		Date March 21, 2005

This collection of information is required by 37 CFR 1.136. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

#366825

COPY

PTO/SB/22 (12-04)
Approved for use through 07/31/2006. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a) FY 2005 *(Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).)*	Docket Number (Optional) 056203.49196DV First Named Inventor: Yutaka MATSUNOBU
Application Number 09/654,615	Filed September 7, 2000
For HYBRID ELECTRICAL VEHICLE EMPLOYING PERMANENT MAGNETIC TYPE DYNAMO-ELECTRIC MACHINE	
Art Unit 7893	Examiner F. B. Vanaman

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above identified application.
The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

		Fee	Small Entity Fee	
☐	One month (37 CFR 1.17(a)(1))	$120	$60	$
☒	Two months (37 CFR 1.17(a)(2))	$450	$225	$ 450
☐	Three months (37 CFR 1.17(a)(3))	$1020	$510	$
☐	Four months (37 CFR 1.17(a)(4))	$1590	$795	$
☐	Five months (37 CFR 1.17(a)(5))	$2160	$1080	$

☐ Applicant claims small entity status. See 37 CFR 1.27.

☒ A check in the amount of $ 450 is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

☒ The Director is hereby authorized to charge any additional fees which may be required, or credit any overpayment, to Deposit Account Number 05-1323. **(Attorney Docket No. 056203.49196DV) I have enclosed a duplicate copy of this sheet.**

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am ☐ the applicant/inventor.

☐ assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed (Form PTO/SB/96).

☒ attorney or agent of record. Registration Number 29,004

☐ attorney or agent under 37 CFR 1.34. Registration number if acting under 37 CFR 1.34 _____

Vincent J. Sunderdick
Signature

March 21, 2005
Date

Vincent J. Sunderdick
Typed Or Printed Name

202-624-2500
Telephone Number

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.

#366829

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	: 09/654,615	Confirmation No.	: 3618
First Named Inventor	: Yutaka MATSUNOBU		
Filed	: September 7, 2000		
TC/A.U.	: 7893		
Examiner	: F. B. Vanaman		
Docket No.	: 056203.49196DV		
Customer No.	: 23911		

COPY

Title : Hybrid Electrical Vehicle Employing Permanent Magnetic Type Dynamo-Electric Machine

AMENDMENT UNDER 37 C.F.R. § 1.111

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the patent Office Action dated September 20, 2004, please amend the above-identified application as follows.

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks begin on page 5 of this paper.

Amendments to the Claims:

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. – 17. (Canceled).

18. (NEW) A hybrid electric vehicle comprising:

a transmission transmitting a forward rotation when receiving a forward rotation input and backward rotation when receiving a backward rotation input, respectively to a drive shaft side after changing speed;

a permanent magnet type dynamo-electric machine one side of which is connected to said transmission; and

an engine connected to another side of said permanent magnet type dynamo-electric machine so as to be separable from the other side of said permanent magnet type dynamo-electric machine,

wherein said permanent magnet type dynamo-electric machine comprises:

a stator having a stator core around which a stator coil is wound; and

a rotor arranged in said stator by a rotational gap,

wherein said rotor comprises:

a rotor core having auxiliary protruding poles; and

a plurality or permanent magnets inserted to a permanent magnet insertion hole formed in an inner portion of said rotor core and arranged in an inner portion of said rotor core,

wherein said plurality of permanent magnets are inserted to said permanent magnet insertion hole so as to be arranged in a circumferential direction such that north poles and south poles are alternately arranged, and

wherein said permanent magnet insertion hole is inclined at a predetermined angle of incline (θ) in a circumferential direction such that a

shape of said rotor in the circumferential direction at each pole is asymmetrical, a ratio between a maximum torque in the forward rotation output by said permanent magnet dynamo-electric machine at a time when the hybrid electric vehicle moves forward and a maximum torque in a backward rotation output by said permanent magnet dynamo-electric machine at a time when the hybrid electric vehicle moves backward establishes a relation 1:1.05-1.2, whereby the maximum torque in the backward rotation of said permanent magnet dynamo-electric machine becomes greater, and a distance from said rotational gap in the forward rotation side becomes greater than a distance from said rotational side becomes greater than a distance from said rotational gap in the backward rotation side, whereby a magnetic flux density of said permanent magnet in the forward rotation side becomes lower than a magnetic flux density of said permanent magnet in the backward rotation side.

19. (NEW) A hybrid electric vehicle as claimed in claim 18, wherein said predetermined angle of incline (θ) is between 10 and 45 degree.

20. (NEW) A permanent magnet type dynamo-electric machine for a hybrid electric vehicle in which one side is connected to a transmission transmitting a forward rotation in the case that an input is a forward rotation and backward rotation in the case that the input is a backward rotation, respectively to a drive shaft side after changing speed, and the other side is connected to an engine so as to be separable from the engine, comprising:

a stator having a stator core around which a stator coil is wound; and

a rotor arranged in said stator by a rotational gap,

wherein said rotor comprises:

a rotor core having auxiliary protruding poles; and

a plurality of permanent magnets inserted to a permanent magnet insertion hole formed in an inner portion of said rotor core and arranged in an inner portion of said rotor core,

wherein said plurality of permanent magnets are inserted to said permanent magnet insertion hole so as to be arranged in a circumferential direction such that north poles and south poles are alternately arranged, and

wherein said permanent magnet insertion hole is inclined at a predetermined angle of incline (θ) in a circumferential direction such that a shape of said rotor in the circumferential direction at each pole is asymmetrical, a ratio between a maximum torque in the forward rotation and a maximum torque in a backward rotation output establishes a relation 1:1.05-1.2, whereby the maximum torque in the backward rotation becomes greater, and a distance from said rotational gap in the forward rotation side becomes greater than a distance from said rotational gap in the backward rotation side, whereby a magnetic flux density of said permanent magnet in the forward rotation side becomes lower than a magnetic flux density of said permanent magnet in the backward rotation side.

21. (NEW) A permanent magnet dynamo-electric machine as claimed in claim 20, wherein said predetermined angle of incline (θ) is between 10 and 45 degree.

Attorney Docket No.: 056203.49196DV
Application No.: 09/654,615

REMARKS

Reconsideration and allowance of this application are respectfully requested in view of the above Amendment and the discussion below.

Although Applicants invention has been discussed in the previous Amendment filed on June 4, 2004, the present invention has now been characterized by new claims 18-21 to further define over the outstanding rejection of claims 5, 7 and 9 as unpatentable over previously cited references to Kwakatsu (U.S. Patent No.: 4,335,429), Tadahiro et al. (JP 8-33246) and the newly cited and newly applied reference to Brown (U.S. Patent No.: 9,989,146) as indicated at item 3 on pages 2 and 3 of the patent Office Action. Claims 13-17 have been rejected over the combination of the above references and further in view of Fumio (JP 9-271,151) as indicated at item 4 on pages 3 and 4 of the patent Office Action.

The present invention, as defined by independent claims 18 and 20, is able to achieve a torque in the reverse direction which is higher than a torque in the forward direction similar to that of a conventional transmission having a forward and backward changing gear. However, the present invention achieves this relationship in a hybrid electric vehicle having a transmission with no forward and backward changing gear. This relation in the present invention is achieved by the permanent magnet type dynamo-electric machine, as claimed, wherein the essential feature is that the permanent magnet insertion hole is inclined at a predetermined angle in the circumferential direction so that the circumferential shape at each pole of the rotor is asymmetrical. Additionally, the distance between the rotational gap in the forward rotational side is greater than the distance from the rotational gap in the backward or the reverse rotation side and the magnetic flux density of the permanent magnet in the forward rotation side becomes lower than the magnetic flux density of the permanent magnet in the reverse rotation side.

Therefore, with the presently claimed invention, the ratio between the maximum torque and the forward rotation output by the permanent magnet dynamo-electric machine at a time when the hybrid electric vehicle moves forward and the maximum torque in the reverse rotation output by the permanent magnet at a time when the hybrid electric moves backward is a ratio of 1:1.05-1.2 so that the maximum torque in the backward rotation of the permanent magnet dynamo-electric machine becomes larger.

The reference to Tadahiro '246, in contrast to the presently claimed invention, discloses a rotor in which a permanent magnet is inserted in a permanent magnet insertion hole which is inclined downward in a rotational direction of a motor (forward rotation direction). This permanent magnet insertion disclosed in Tadahiro is inclined in this downward direction in order to intensify the magnetic flux of the permanent magnet in the forward rotation direction. Additionally, the leakage flux preventing hole is provided between the permanent magnets adjacent in the circumferential direction in order to prevent leakage flux from the permanent magnets.

As a result, in Tadahiro, the magnetic flux density of the permanent magnet in the rotational direction (forward direction) becomes higher than the magnetic flux density of the permanent magnet in the backward rotation so that the magnetic flux density of the permanent magnet in the forward rotation side does not become lower than the magnetic flux density of the permanent in the backward or reverse rotation side which is not only different, but exactly the opposite from the presently claimed invention. Therefore, Tadahiro has a maximum torque in the forward rotation direction which becomes greater than the maximum torque in the backward direction which is absolutely an opposite result than the presently claimed invention.

The present invention reduces the magnetic flux (effective magnetic flux) of the permanent magnet running into the stator side and the forward rotational direction in order to lower the magnetic flux density of the permanent magnetic, which is an entirely different concept from Tadahiro in which the leakage flux

preventing hole is provided for preventing leakage flux from the permanent magnet.

The reference to Kawakatsu '429 discloses a parallel type hybrid electric vehicle with no discussion or disclosure of the permanent magnet type dynamo-electric machine claimed in the present invention. Additionally, the '429 reference discloses a conventional transmission having both the forward and backward changing gear.

The reference to Brown '146 discloses a transmission for a four-wheel drive with a relationship whereby the torque for the backward drive is greater than the torque for the forward drive, but has no disclosure of a permanent magnet type dynamo-electric machine as described and claimed in each of independent claims 18 and 20. Claims 18 and 20 specify a hybrid electric vehicle having a permanent magnet type dynamo-electric machine connected to a transmission wherein the rotor of the machine has a permanent magnet inserted in a hole in order to be arranged in a circumferential direction so that the north and south poles are alternately arranged and this magnetic insertion hole is inclined at a predetermined angle of incline to provide an asymmetrical shape of the rotor with the ratio of the maximum torque in the forward direction and the maximum torque in the backward direction having a relationship of 1:1.05-1.2 so that the maximum torque in the backward rotation direction becomes greater and so that a distance from the gap in the forward rotation side becomes greater than the distance from the rotation gap in the backward rotation side to provide flux density in the forward rotation lower than flux density in the backward rotation.

Applicants respectfully submit that independent claims 18 and 20 clearly provide structure not shown or disclosed or made obvious by the references or their combination even if, for purposes or arguments, the references could be combined.

Accordingly, Applicants respectfully request that this application containing claims 18-21 be allowed and passed to issue.

Attorney Docket No.: 056203.49196DV
Application No.: 09/654,615

If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #056203.49196DV).

Respectfully submitted,

March 21, 2005

Vincent J. Sunderdick
Registration No. 29,004

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P.O. Box 14300
Washington, DC 20044-4300
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VJS:ddd

#366773

14

Crowell & Moring LLP

Today's Date: March 21, 05

Attorney Docket: 056203.49196
First Named Inventor: Yutaka MATSUNOBU
Serial No.: 09/654,615
Filing Date: September 7, 2000

The following has been received in the U.S. Patent & Trademark Office on the date stamped hereon:

X Fee Transmittal (in duplicate)
X Two-month Petition for Extension of Time (in duplicate)
X Amendment 1.111
X Check No. 28163 in the amount of $450

VJS:ddd

DUE DATE: March 21, 2005